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SCIENCE.

FRIDAY, MAY 16, 1884.

COMMENT AND CRITICISM.

THOSE interested in making out the connection between the periods of recurrence of the solar spots and every kind of meteorological phenomena, crops, panics, and the like, will derive little that is comforting from the unusual spottedness of the sun's surface of late. Just as astronomers may be said to have concluded that the sun-spots wax and wane according to some pretty regular period, the length of which appeared to be determined with a fair approach to the desired accuracy, the sun itself interrupts the continuity of their successful prediction by an abnormal lagging of the present maximum: for the epoch of this phenomenon, as inferred from the best interpretation of the records of the past, lies somewhere in the year 1882, or the early part of the year following. In point of fact, there appears to be ground for doubting whether the true maximum may not, even now, be a thing of the future.

Rather less of encouragement will those astrophysical theorists of sun-spot periodicity receive who stand stoutly for the notion that the increase and decline of the spots are traceable to planetary position and influence, even if there were no other spot-phenomena, which this theory is powerless to explain. And the meteor-origin theorists are in almost equal difficulty. On the other hand, the more plausible explanation of this periodicity — that the solar globe determines within itself, and independently of all exterior perturbing action, the extent and duration of the absence or prevalence of the spots on its surface — receives re-enforcement rather than otherwise from the present manifestations of spot-activity; for, on this theory, the periodicity is more likely to be irregular than the reverse. The new periods of short duration, discovered by Professor

Stewart, are likewise, on this same basis, accounted for most easily, and with greater accuracy. The likelihood that solar energy, as displayed in spot-production, has been on the increase during the year 1883, and the certainty that it has not largely waned since that time, render it very probable that we have not yet accumulated sufficient data for deciding with exactitude upon the true epoch of the present spot-maximum.

D. H. TALBOT of Sioux City, Io., has addressed an open letter to the Hon. W. B. Allison to advocate the establishment of a zoölogical preserve within the boundary of the Yellowstone Park, where bears and deer shall be enticed to breed and abide, defended by a guard from human encroachment. There is to be an honest, competent observer in charge, who is to make notes, which may "be published in like manner as the reports of the Smithsonian institution." Mr. Talbot's scheme is vague; its opponents will call it visionary: nevertheless, we entirely agree with him as to the interest and value of reserving some territory where our large mammals may be secure from extirpation; but we do not feel assured, that if, as Mr. Talbot proposes, three species of bears are to be brought within one comparatively small territory, together with some ten other animals, mostly deer, all the happy family will survive the intensified struggle for existence. Nevertheless, Mr. Talbot's scheme is a valuable suggestion, which we trust will receive careful consideration from the proper authorities.

SHORTLY after the announcement of the law of storms by Dove and Redfield, fifty years ago, mariners became familiar with the expressions 'dangerous' and 'manageable semicircle,' referring to the sides of the storm-disk where the velocity of the winds was respectively re-en-

forced and diminished by the progression of the storm. But on lands in the temperate zone these terms have had little application; for there cyclones proper are seldom destructive, and, as a general thing, do less harm by their winds than they do good by their rains. There will, however, soon be need, at least in our western and southern states, of a corresponding expression, such as the 'dangerous octant,' to denote the sector between south and east of the broad storm where local tornadoes may be developed; for the surmise that tornadoes were thus definitely related to cyclones, suggested by the signal-service studies of a year or two ago, is rapidly becoming a well-proved fact by the investigations of this season. It is the most interesting discovery in meteorology that has been made of late years, in its theoretical as well as in its practical bearings.

LETTERS TO THE EDITOR.

**** Correspondents are requested to be as brief as possible. The writer's name is in all cases required as proof of good faith.*

Radiant heat.

IN his letter to *Science* of the 15th of February, Professor Eddy states, that, in his opinion, the direction of the rays entering the region *B* is immaterial. As I am sure no other American or other scientific man agrees with him, I do not think it worth while, now that the issue has been reduced to this question, for me to continue a correspondence of the kind across the Atlantic, especially as Professor Eddy's mistakes have already been pointed out by Professor De Volson Wood.

As I am writing, I may, however, as well point out Professor Eddy's mistake in the arrangement he proposes as a substitute for mine. I agree that fig. 1 and fig. 2 represent what would happen; but fig. 3 does not represent all that would happen, as evidently, if heat can go into *B* in the direction y/z , as in fig. 2, there would be an escape of heat from *B* in the direction zy' , as well as that in the direction zy represented in fig. 3; and so, to the two quantities of heat coming into *B* in fig. 2, there would escape two equal quantities, which should have both been represented on fig. 3; and then, evidently, *B* is no better off than before.

Professor Eddy, I hope, will recollect that a pencil of rays of infinitesimal angle can only contain an infinitesimal quantity of heat. I make the remark because an omission to notice this fact is the only excuse I can see for the curious remark in the penultimate paragraph of his letter.

GEO. FRAS. FITZGERALD.

Trinity college, Dublin.

Another 'yellow day'

On the afternoon of May 2 a strong wind from the south-west brought to our position (seven miles

due west of West Point) thick clouds of smoke from the forest-fires in Pennsylvania and northern New Jersey. At 4.15 P.M. the sun had become completely obscured, and occasionally cinders and bits of charred leaves were borne past by the wind. The increasing density of the smoke was accompanied by a strange brassy, yellow light, which grew more vivid as the sun disappeared, and was most brilliant from five to six o'clock. It pervaded the whole sky with a diffused brassy glow, which was reflected into interiors so that an object placed before a window cast a perceptible shadow, yet the actual amount of light was less than in ordinary foggy or cloudy weather. The flame of a student-lamp had a white, dazzling appearance, not unlike the electric light. The green color of grass and foliage became of a most vivid quality, and the various shades of red seemed unusually prominent. This was attended by a high wind of from thirty to forty miles per hour, the highest temperature of the season, falling barometer, and a remarkably low percentage of relative humidity, as the following records show in part:—

Hour.	Temperature.	Relative humidity.
1 P.M.	81.0°	44%
2 "	82.0	38
3 "	81.5	33
4 "	81.0	22
5 "	80.0	15
6 "	67.0	42
7 "	61.0	45

The noteworthy feature of the phenomenon was its similarity to that of the well-remembered 'yellow day,' Sept. 6, 1881, the explanation of which was the subject of so much discussion. But, since the cause of the later occurrence was so unmistakably the presence of smoke in the air, persons who witnessed both can have little doubt that the same cause operated in the former case.

WINTHROP E. STONE.

Houghton Farm, Orange co., N.Y.

Cretaceous phosphates in Alabama.

I send you by mail some specimens of phosphatic nodules recently discovered in Perry county, in this state. Their true character was first suspected by Mr. William Spencer, on whose land they are found in abundance. Specimens were sent by him to Dr. C. U. Shepard, jun., of Charleston, S.C., and to myself, for examination, with the result of showing that they were nearly pure phosphate of lime. The geological position of this occurrence is different from that of the South-Carolina phosphates, as they are found at the base of the cretaceous rotten limestone; but the mode of occurrence is quite similar, as may be seen below.

A section (descending) of the strata at Hamburg, in Perry county, is about as follows:—

1. Rotten limestone, only the lowermost beds of which are here present.

2. Greensand beds from one to four or five feet in thickness. These beds appear to be impregnated with phosphoric acid; analyses of several specimens, selected from different spots, showing an average of about twenty per cent.

3. Sandy, calcareous beds about six feet in thickness. Where these beds outcrop in the fields, the surface of the ground is covered with nodules similar to the specimens sent herewith. These nodules